

removing WF_6 gas from the processing vessel by purging gas into the processing vessel; and

nitriding the film containing tungsten by supplying a gas containing nitrogen.

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113. (New) The method according to Claim 112, wherein the nitriding of the film is performed by generating plasmas with the gas containing nitrogen.

114. (New) The method according to Claim 112, wherein the forming of the film and nitriding of the film are performed in the same processing apparatus or different processing apparatus.

115. (New) The method according to Claim 112, wherein the gas containing nitrogen includes at least one of NH_3 , MMH, and N_2 .

116. (New) The method according to Claim 112, wherein the film containing tungsten is formed at a temperature of about 300 to 450°C and on a pressure of about 0.5 to 80 Torr.

117. (New) The method according to Claim 112, wherein the film containing tungsten is made of W or Wsix.

118. (New) The method according to Claim 112, wherein the nitriding of the film is performed by using MMH gas under following process conditions:

an amount of MMH gas: about 1-20 sccm,

temperature: about 300-450°C,

pressure: about 0.1-5 Torr.

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119. (New) The method according to Claim 112, wherein the nitriding of the film is performed by using N₂ gas under following process conditions:

an amount of N₂ gas: about 50-300 sccm,

temperature: about 300-450°C,

pressure: about 0.1-5 Torr.

120. (New) The method according to Claim 112, wherein the film containing tungsten is made of W_nx or W_sixN_y.

121. (New) A method of forming a barrier metal film formed of a nitride film including tungsten by a thermal CVD, comprising

positioning a substrate in a processing vessel;

maintaining a predetermined pressure in the processing vessel;

forming a film containing tungsten on the substrate by supplying gas containing tungsten and gas containing hydrogen into the processing vessel;

shutting off the supplying of the gas containing tungsten and the gas containing hydrogen into the processing vessel;

removing the gas containing tungsten from the processing vessel by supplying an inert gas into the processing vessel; and

nitriding the film containing tungsten by supplying a gas containing nitrogen.

122. (New) The method according to Claim 121, wherein the nitriding of the film is performed by generating plasma with the gas containing nitrogen.

123. (New) The method according to Claim 121, wherein the gas containing nitride includes at least one of NH_3 , MMH, and N_2 .

124. (New) The method according to Claim 121, wherein the gas containing H_2 includes at least one of H_2 gas, SiH_4 gas, Si_2H_6 gas, and SiH_2Cl_2 gas.

125. (New) The method according to Claim 121, wherein the film containing tungsten is formed at a temperature of about 300 to 450°C and on a pressure of about 1.0 to 80 Torr.

126. (New) A method of forming a barrier metal film formed of a nitride film including tungsten by a thermal CVD, comprising:

positioning a substrate in a processing vessel;

maintaining a predetermined pressure in the processing vessel;

forming a film containing tungsten on the substrate by supplying WF_6 gas and SiH_4 gas or H_2 gas into the processing vessel;

shutting off the supplying of the WF_6 gas and SiH_4 gas or H_2 gas into the processing vessel;

removing the WF_6 gas from the processing vessel by supplying an inert gas into the processing vessel; and

nitriding the film containing tungsten by supplying a gas containing nitrogen and forming a plasma of the gas containing nitrogen.

127. (New) The method according to claim 126, wherein the gas containing nitride includes at least one of NH_3 , MMH, and N_2 .

128. (New) The method according to Claim 126, wherein the film containing tungsten is formed at a temperature of about 300 to 450°C.

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 112-128 are presently active in this case; Claims 89-111 canceled and Claims 112-128 added by way of the present amendment.

In the outstanding Office Action, the supplemental declaration filed November 4, 2002, was objected to; Claims 89-111 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter not described in the specification; Claims 107-111 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Meikle, Agnello, Park, and Fleming when taken together; Claims 87-106 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Meikle, Agnello, Park, and Fleming, and further in view of Lee.

With regard to the objection to the supplemental declaration as failing to identify or acknowledge the amendment that included Claims 89-111, Claims 89-111 have now been canceled and therefore the objection to the declaration is moot. Moreover, Applicants submit that new Claims 112-128 are “substantially embraced” by the original claims or the original